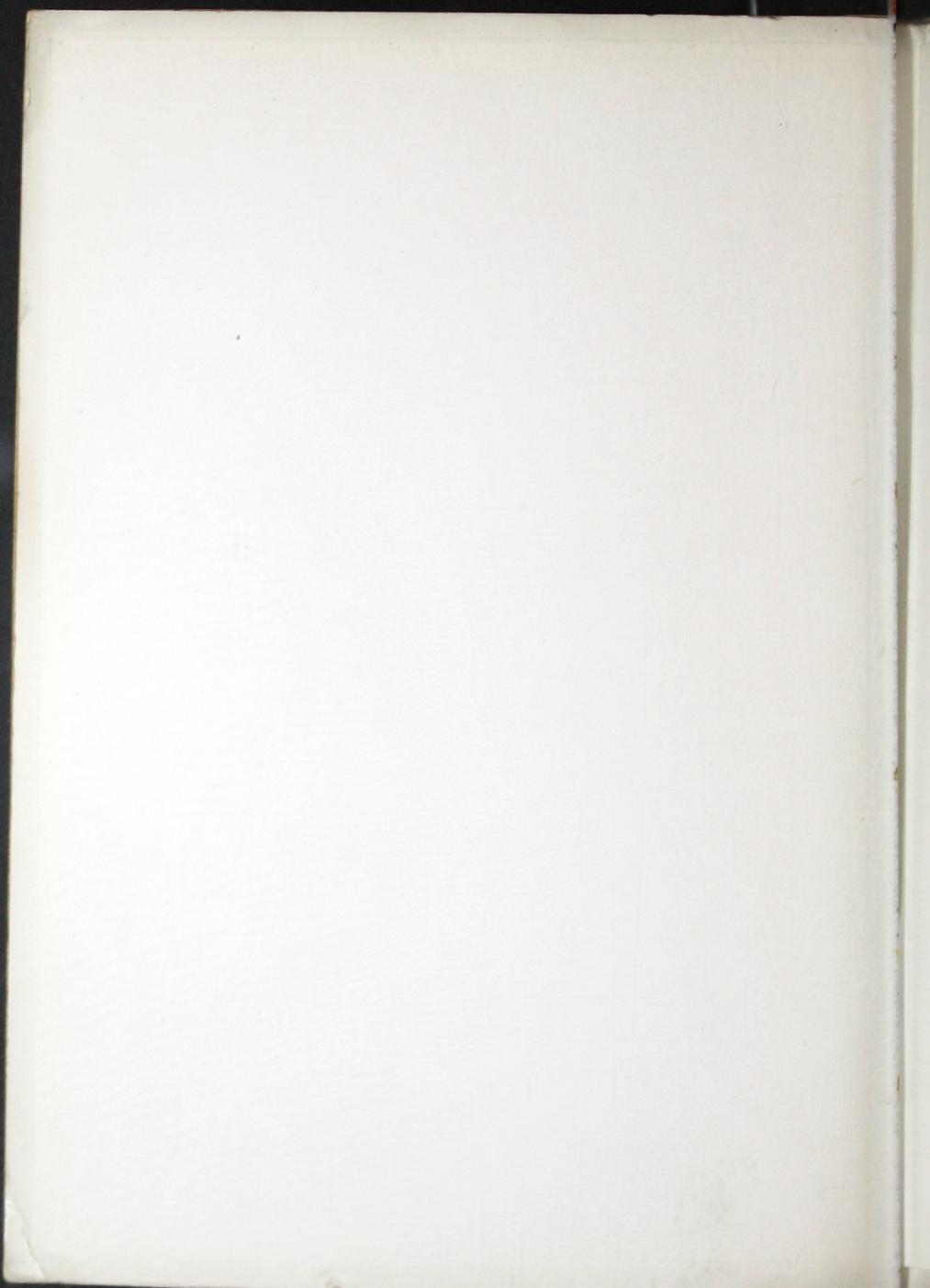


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NONPAREIL INSULATING BRICK



A New Type of
Heat Insulation



SEP 4 1914



Nonpareil Insulating Brick

For Boiler Settings
Furnaces, Breechings
Stacks, Kilns, Bake
Ovens, Stills, Etc.

NONPAREIL
Trade Mark
Reg. U. S. Pat. Off.

Armstrong Cork Company
Insulation Department
Pittsburgh, Pa. - - - U. S. A.



Nonpareil Insulating Brick

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Armstrong Cork Company
Insulation Department
Pittsburgh, Pa.

Nonpareil Insulating Brick

FOR many years there has existed a real need for a heat insulating material which would combine low heat conductivity with mechanical strength sufficient to enable it to be built in as a part of the structure itself. This need has made itself particularly felt in connection with boiler settings, superheaters, and ovens and furnaces of various descriptions where the insulating medium must, in addition to the two requirements just mentioned, be able to resist relatively high temperatures.

*A
Structural
Form
of Insulation*

To meet this demand, Nonpareil Insulating Brick have been placed on the market. In Europe a similar product has been available and, in fact, in general use for the past fifteen years. Hence, while Nonpareil Brick are new in one sense, they are not new in the sense of being experimental in character. They have been fully tested under various service conditions and are giving universal satisfaction.

*Popular
in
Europe*

Where the Brick May be Used

*A
Suggestive
List*

Many places, where an insulating material of this character could be used to advantage, are at once apparent. The following list must not be regarded as in any way exhaustive, since to the engineer interested in conserving heat and thus reducing unnecessary waste, many other profitable uses for this re-



Insulating a Boiler Setting with Nonpareil Brick

The fire brick may be seen next to the tubes, then a double course of common brick and on the outside a single course of Nonpareil Brick. The exposed surface will be finished with a coat of cement plaster.

markable insulating medium will at once suggest themselves:

Annealing Furnaces	Heat Treatment Furnaces
Bake Ovens	Hot Blast Mains
Boiler Settings	Lehrs
Breechings	Oil Stills
Brick Kilns	Pottery Kilns
Coke Ovens	Recuperators in Glass Plants
Dry Kilns	Regenerating Furnaces
Drying Rooms	Reheating Furnaces
Enameling Furnaces	Retorts
Gas Producers	Soaking Pits
Generators in Glass Plants	Stacks
Heating Furnaces	Superheaters
	Tempering Furnaces

It should be definitely understood that Nonpareil Insulating Brick are not in any sense a refractory material. They are not designed, nor can they be used as a substitute for fire brick. They are intended to be employed simply to back up fire brick in places where the retention of heat is desirable.

*Not a
Refractory
Material*



Some of the Beds of Diatomaceous Earth are Hundreds of Feet Thick

Description

How Made

Nonpareil Insulating Brick are composed of diatomaceous earth (known also as kieselguhr and infusorial earth), a small amount of clay, and finely ground cork. The mixture while wet is molded into brick measuring $9 \times 4 \times 2\frac{1}{2}$ inches, which are dried and then fired. The cork is first carbonized and then gradually burns out completely. In this

way, the brick is subjected to uniform heat through its entire mass. The burning out of the cork leaves the brick porous in texture and a light terra cotta in color. The cover of this booklet is a close representation of their appearance. The cubical contents of a single brick are 90 cubic inches. The weight averages $1\frac{1}{2}$ pounds. A cubic foot of the material, therefore, weighs approximately 29 pounds.

*Porous
in Structure*



The Cork Oak — Native of Spain and Portugal
The outer bark of this tree is the cork of commerce

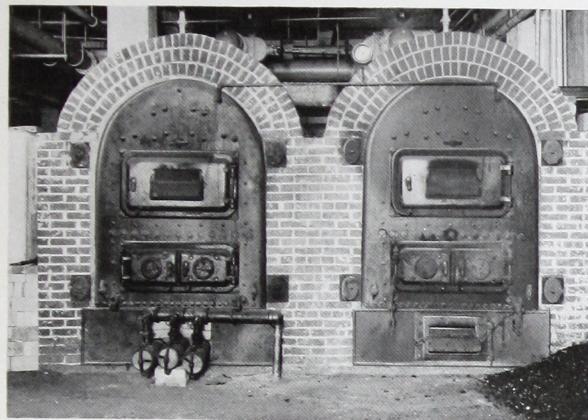
Advantages

*Five Points
of Merit*

The advantages of Nonpareil Insulating Brick may be summarized under five heads, viz.: (a) *Insulating Efficiency*; (b) *Resistance to High Temperatures*; (c) *Structural Strength*; (d) *Moisture-Resisting Power*; (e) *Moderate Cost*. These points will now be considered briefly in the order mentioned:

*Ten Times
as Efficient
as Ordinary
Brick*

1. *Insulating Efficiency*: The heat conductivity of Nonpareil Insulating Brick is approximately 12 British Thermal Units per square foot per degree difference in temperature per one-inch thickness per twenty-four hours. As the process of manufacture is being steadily improved, the transmission will, in all probability, be reduced. The transmission through fire brick or ordinary building brick will average 120 B. T. U. per square foot per degree difference in temperature per one-inch thickness per twenty-four hours. Thus Nonpareil Insulating Brick transmit one-tenth of the heat transmitted by ordinary building brick; or in other words, the insulating

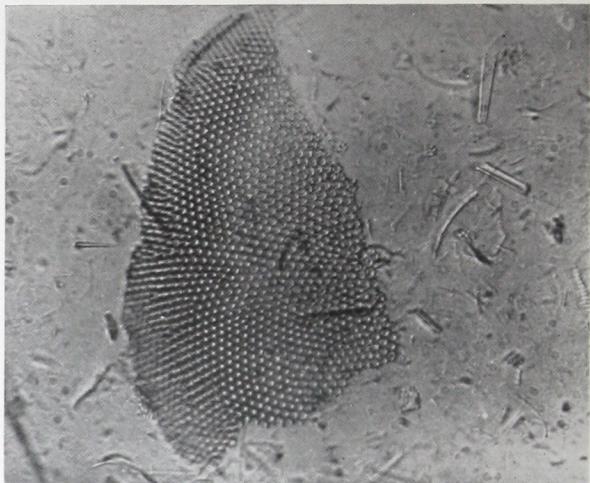


Heater Insulated with Nonpareil Brick

efficiency of a single course of Nonpareil Brick 4 inches thick is equivalent to that of 40 inches of ordinary brick.

The insulating value of Nonpareil Brick is due to the remarkable structure of the diatomaceous earth, of which they are chiefly composed. Diatomaceous earth is a peculiar white substance, very light in weight. It is composed of the skeletons or shells of minute plants — known as diatoms — that grew in the waters that covered the earth ages ago. When death ensued, the organic matter

*Diatomaceous
Earth*



Diatomaceous Earth under the Microscope
Each diatom is hollow and filled with air

quickly decayed but the skeletons or shells of almost pure silica, sinking to the bottom, remained unaffected, being insoluble in water. In the course of time immense beds of diatomaceous earth were thus formed. Some are found today high and dry above the sea — hundreds of feet in thickness.

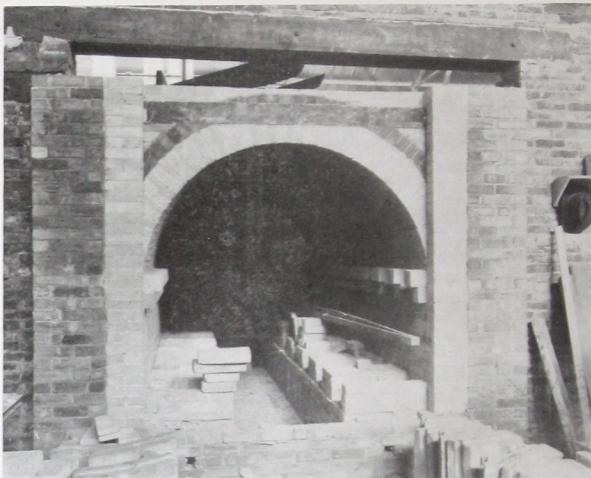
*A Natural
Heat Insulator*

The diatoms are so small that it has been estimated that there are as many as thirty-nine billion of them to the

cubic inch. Each skeleton or shell is hollow and filled with air, and it is due to the large volume of air thus confined in minute particles that diatomaceous earth owes its pre-eminence as a natural heat insulating material. In view of this, it is easy to understand why Nonpareil Brick are such excellent non-conductors of heat. Their installation cuts down heat waste, makes it easier to maintain stable temperature conditions, and by reducing the temperature of the rooms in which the boilers or furnaces are situated, promotes the comfort and efficiency of the workmen.

2. *Resistance to High Temperatures:* Being composed so largely of diatomaceous earth which, as just explained, is practically pure silica, Nonpareil Brick will withstand relatively high temperatures — much higher in fact than any other form of insulation designed for similar purposes. The fusing point is about 1600 degrees F. It becomes feasible, therefore, by using Nonpareil Insulating Brick to provide adequate

*Fusing
Point about
1600° F.*

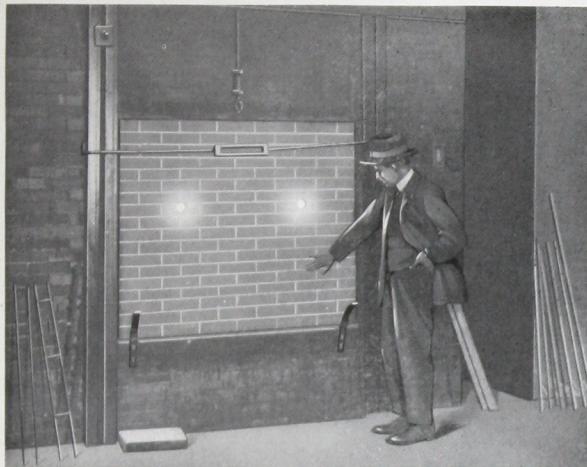


Annealing Furnace Insulated with Nonpareil Brick — Ingram-Richardson Co., Beaver Falls, Pa. The inner lining of fire brick backed up by the darker-colored insulating brick may be plainly seen

*Reduce
Heat Loss*

insulation in many places where, heretofore, it has been impossible to do so. Since the heat loss becomes steadily greater as the temperature increases, it is obvious that the application of Nonpareil Brick will in many instances result in such immediate reduction of heat loss as to repay speedily the small additional outlay involved.

3. *Structural Strength:* As has been pointed out above, Nonpareil Insulating



Nonpareil Brick Used in Insulating a Furnace Door

Brick combine insulating efficiency with a sufficient degree of strength to enable their being used as a structural material. While weighing but $1\frac{1}{2}$ pounds each, they will stand a crushing load of 140 pounds to the square inch. They are just as easy to lay as ordinary brick, and in fact, are more readily shaped and cut, where fitting becomes necessary. Detailed instructions for installing them are given on pages 17-26.

*Strong and
Easy to
Handle*

*Unaffected
by Water or
Steam*

4. *Moisture-Resisting Power:* Another marked advantage of Nonpareil Insulating Brick as compared with other insulating materials is its resistance to moisture. The brick may be soaked in water or subjected to steam for an indefinite period of time, and after being permitted to dry out will be found to be as strong and efficient as they were before such treatment. There need be no hesitancy, therefore, in employing them in places where they may be subjected periodically to water or dampness.

*Soon Pay for
Themselves*

5. *Moderate Cost:* The cost of Nonpareil Insulating Brick is very reasonable. In most instances they will soon pay for themselves by reducing the heat loss. It should further be borne in mind that they will replace an equal number of ordinary brick, so the cost of the latter should be subtracted in making up any estimate of comparative cost.

Methods of Installation

In installing Nonpareil Insulating Brick the importance of securing continuous insulation — without breaks — should be kept constantly in mind. The brick should be laid in a special insulating cement, 400 pounds of which are supplied with every 1,000 brick. This cement is composed of practically the same substances as the brick themselves and has substantially the same insulating value. Thus Nonpareil Insulating Brick laid with this special cement, provide a solid, unbroken wall of insulation. The cement should be mixed with water to a thin mortar, and as the brick are put in place, they should first be dipped in water and then laid in a full bed of the mortar — approximately $\frac{1}{4}$ -inch thick. The mortar should be applied with a trowel, care being taken to fill up all joints completely.

As indicated in Figs. 1 and 2, Nonpareil Insulating Brick may be laid be-

*A Solid
Unbroken
Wall of
Insulation*

*Used to Back
up Fire Brick*

tween the inside fire brick and the outside common brick, or they can be placed outside the common brick and the exposed surface finished off with a coat of cement plaster. (See Fig. 3.) In every case, an inner lining of fire brick must be used, for Nonpareil Brick are not a refractory material and will not withstand the abrasion to which fire brick are ordinarily subjected. Figure 4 shows how Nonpareil Brick may be utilized in insulating division walls between boilers, furnaces, etc. Such installation is desirable in cases where separate operation may at times be necessary.

Wall Ties

To hold the courses of the different brick together, metal wall ties extending through from the common brick to the fire brick can be utilized (Fig. 5) or the brick can be tied together in the manner indicated in Figs. 1, 2, 3, and 4. Care must be taken to place all buck stays outside the Insulating Brick, or to leave openings around them to permit the circulation of air, as otherwise the heat might cause them to bend.

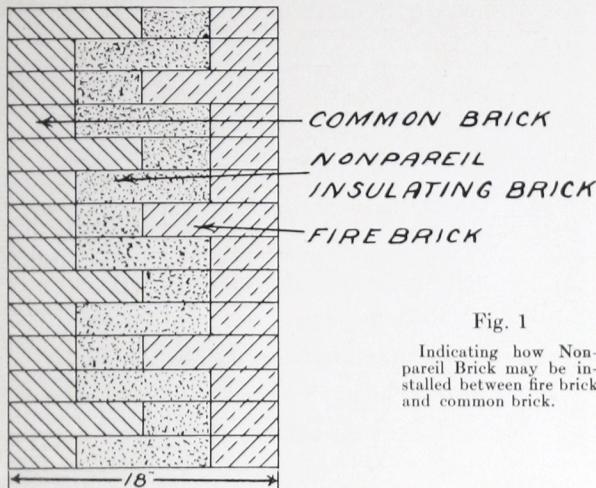


Fig. 1

Indicating how Nonpareil Brick may be installed between fire brick and common brick.

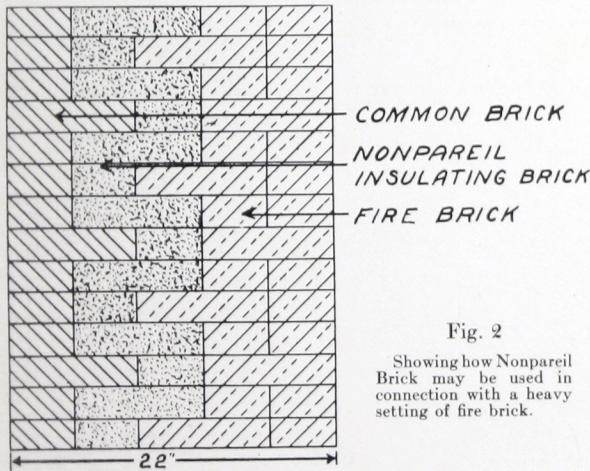


Fig. 2

Showing how Nonpareil Brick may be used in connection with a heavy setting of fire brick.

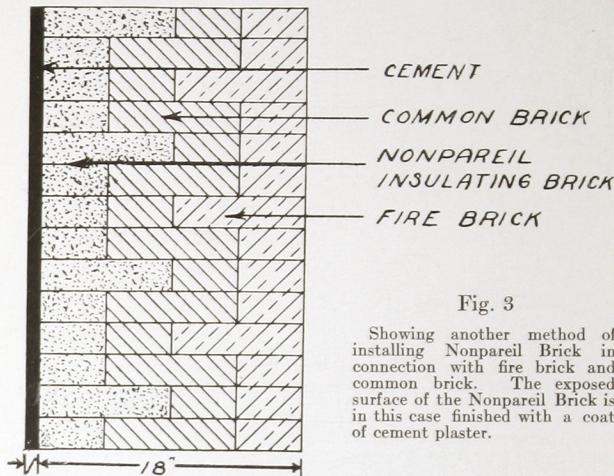


Fig. 3

Showing another method of installing Nonpareil Brick in connection with fire brick and common brick. The exposed surface of the Nonpareil Brick is in this case finished with a coat of cement plaster.

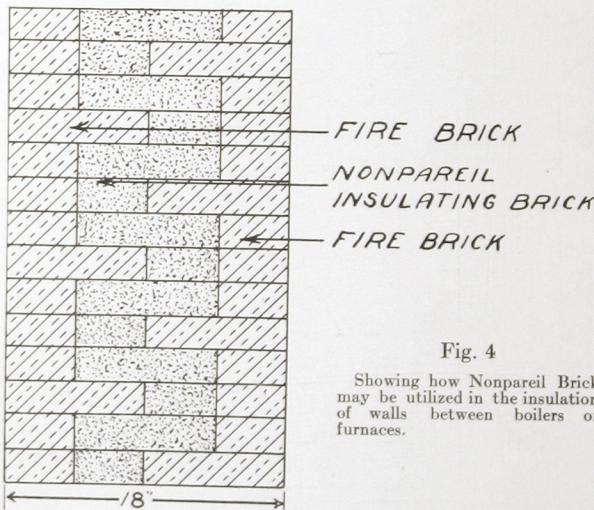


Fig. 4

Showing how Nonpareil Brick may be utilized in the insulation of walls between boilers or furnaces.

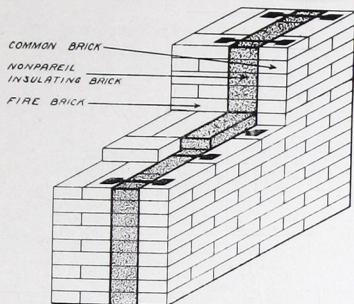


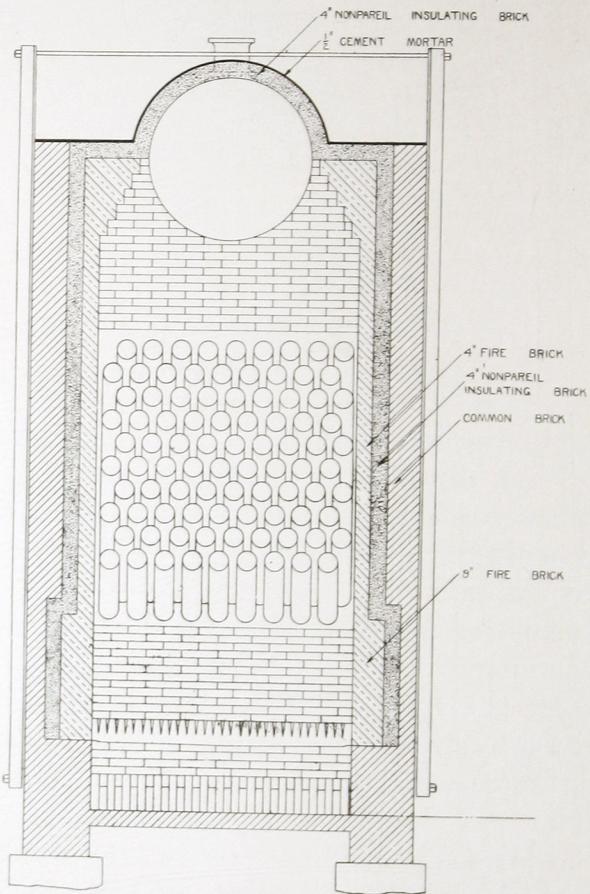
Fig. 5

Metal Ties May be Used to Hold the
Different Courses of Brick Together

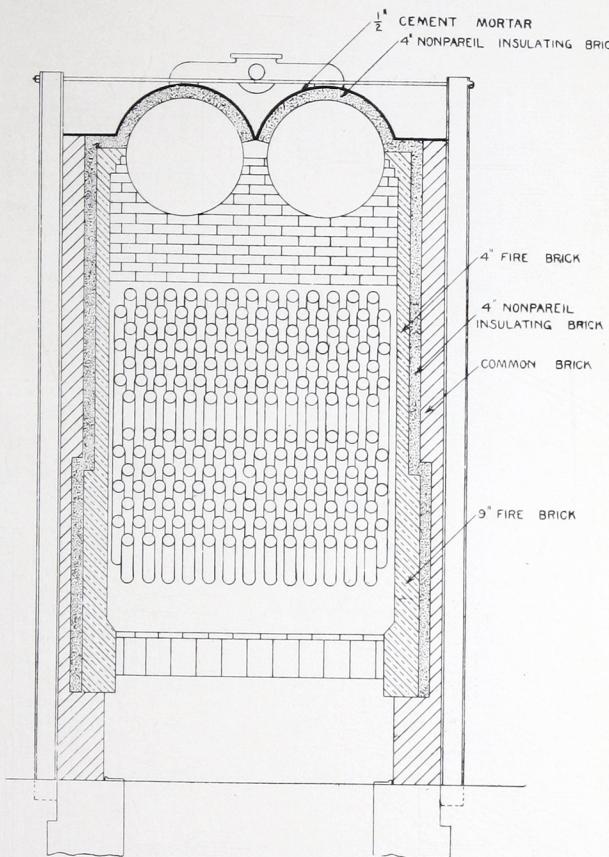
On the following pages will be found several drawings indicating how Nonpareil Brick may be used in the insulation of typical boiler and furnace settings. As will be noted, no means for tying the Insulating Brick to the fire brick and common brick have been indicated on these drawings. This matter is left to the discretion of the engineer. Methods of installation adapted to other conditions will no doubt suggest themselves, but if peculiar difficulties arise, the services of our engineers are at the disposal of prospective buyers without charge or implied obligation.

*Typical
Installations*

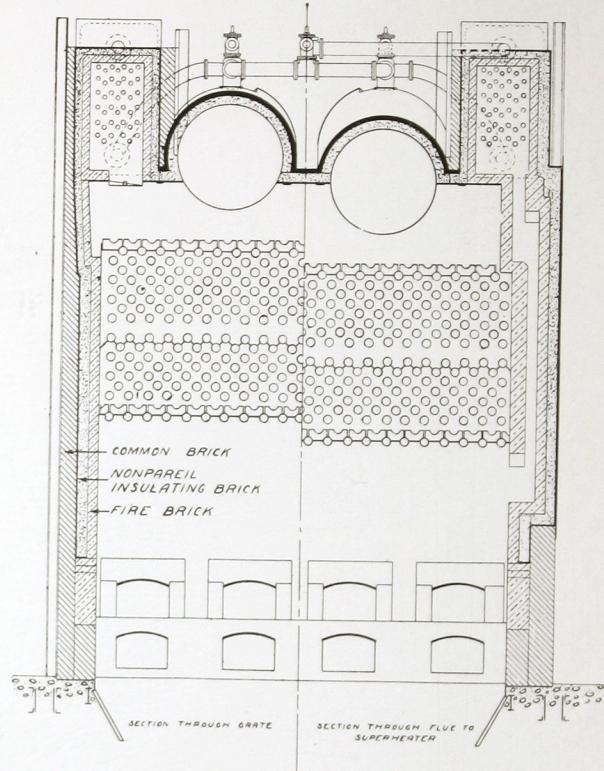
N O N P A R E I L I N S U L A T I N G B R I C K



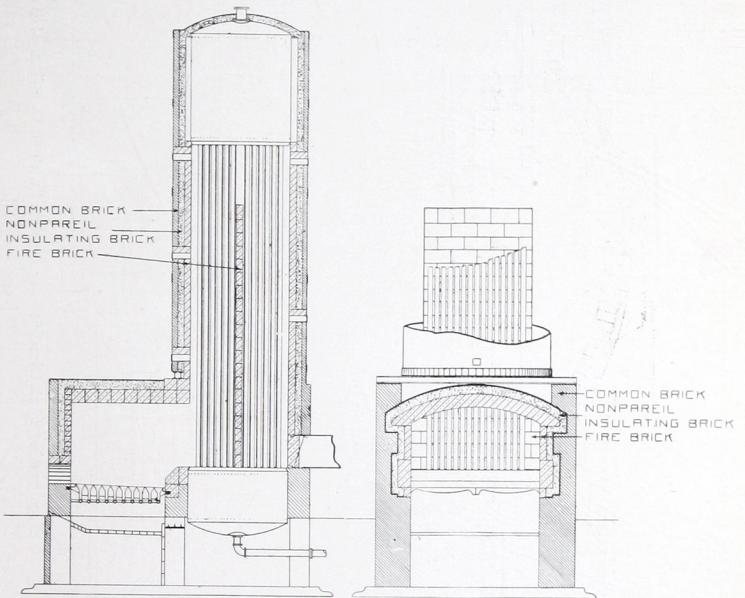
Section Through Setting of Return Tube Single Horizontal Drum Boiler
Insulated with Nonpareil Insulating Brick



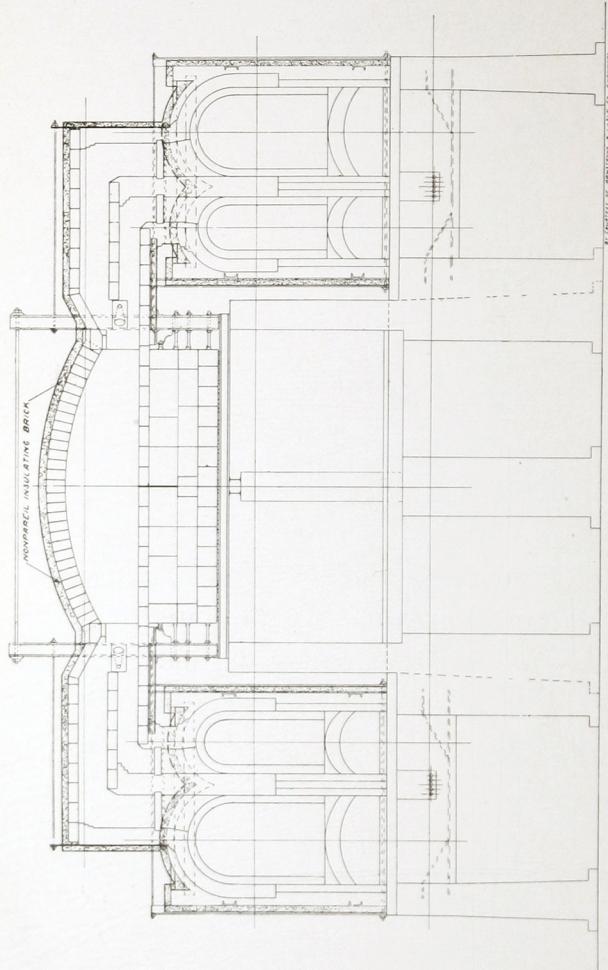
Section Through Setting of Return Tube Double Horizontal Drum Boiler
Insulated with Nonpareil Insulating Brick



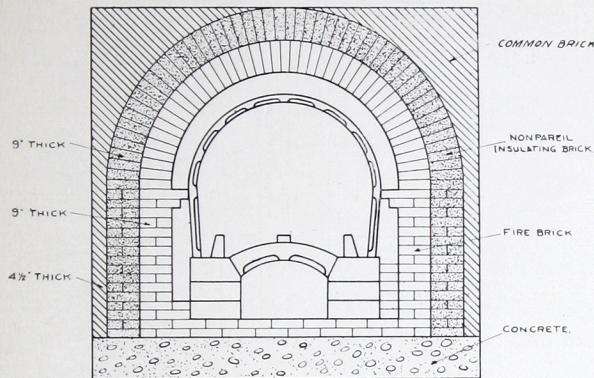
Setting for Double Drum Water Tube Boiler Insulated with
Nonpareil Insulating Brick



Setting for Vertical Boiler with Dutch Oven Grate Insulated with
Nonpareil Insulating Brick



Regenerating Tank Glass Furnace Insulated with Nonpareil Insulating Brick



Muffle Furnace, Standard Type, Insulated with
Nonpareil Insulating Brick

Service Details

Nonpareil Insulating Brick measure $9 \times 4 \times 2\frac{1}{2}$ inches. They weigh $1\frac{1}{2}$ pounds each or approximately 29 pounds to the cubic foot. Allowing for the space occupied by the cement mortar, it is safe to figure 6 brick to the square foot for a 4-inch wall, in estimating the number of brick required for a given piece of work.

With each 1,000 brick, 400 pounds of *Cement* Nonpareil Insulating Cement are sup-

*Figure Six
Brick per
Square Foot
of Wall
Surface*

plied — without additional charge. This cement is shipped in bags holding approximately 100 pounds each.

*Shipping
Details*

Small quantities of Nonpareil Brick have to be crated. The crates hold 88 brick and weigh approximately 150 pounds each. Carload lots can be shipped in bulk. Approximately 12,000 brick (with cement) constitute a minimum carload of 24,000 pounds. In Official Classification Territory, the brick take the third class rate in less than carloads, fifth class in carloads. They are manufactured at Beaver Falls, Pa.

Samples and Prices

*Free
Engineering
Service*

Samples, prices and further information will be cheerfully supplied on request. Our Engineering Department will be glad to cooperate with prospective users of Nonpareil Brick in devising ways and means for their economical and effective application. Branch offices or representatives will be found in all the larger cities.

Nonpareil High Pressure Covering for Steam Lines

The constantly increasing tendency to use steam at high temperatures and the growing popularity of superheated steam has created a demand for a more efficient type of insulation for steam lines. Nonpareil High Pressure Covering not alone possesses higher insulating efficiency than the older forms of covering, but also has several points of merit that are peculiarly its own.

The covering is distinctive because it is the only covering made of diatomaceous earth and asbestos. It contains no cork whatever. As explained on page 12 of this book, diatomaceous earth consists of a mass of minute shells or skeletons — each one of which is hollow and filled with air. For many years its insulating value was well-known but no method was available by which it could be bonded together in the various forms requisite for pipe covering purposes. This problem was finally solved, however, and Nonpareil High Pressure Covering is the result.

Nonpareil High Pressure Covering has been on the market for more than four years and the marked favor with which it has been received is already evidenced by hundreds of installations. Compared with other coverings, Nonpareil High Pressure Covering is not only a better non-conductor of heat, but will withstand much higher temperatures without calcining or disintegrating.

*A Better
Insulator*

*Made of
Diatomaceous
Earth*

Its Merits



Look for the Diamond-Shaped Black Label on every Section of Nonpareil High Pressure Covering

*Made in
Sectional,
Block and
Cement form*

*Catalogue,
Samples and
Prices*

It is particularly well-suited, therefore, for the insulation of superheated steam surfaces. Moreover, it will bear repeated wetting and drying without injury and for this reason is an ideal form of covering for underground steam lines. It is easy to apply — being furnished in sectional block and plastic cement form — and so far as price is concerned, will compare favorably with any high pressure covering on the market.

The story of Nonpareil High Pressure Covering has been told in full in an attractive little bound book. It will prove a real addition to your business library. Copy will be sent on request and samples and prices will be cheerfully furnished by our branches and representatives throughout the country. Our engineers will be glad to help you design and install your next steam covering job on a thoroughly scientific basis.

The Armstrong Line

Corks of every description

Discs and Washers

Bungs and Taps

Insoles

Handles

Bath and Table Mats

Life Preservers

Buoys

Yacht Fenders

Armstrong's Linoleum—plain, printed and inlaid

Nonpareil Cork Floor Tiling—for libraries, museums, billiard rooms, bath rooms, etc.

Cork Paving Brick—for stables, shipping platforms, warehouses, etc.

Nonpareil, Acme and Eureka Corkboard—for insulating cold storage rooms

Nonpareil Cork Covering—for cold pipes

Nonpareil High Pressure Covering—for steam lines, boilers, etc.

Nonpareil Insulating Brick—for boiler settings, furnaces, retorts, ovens, etc.

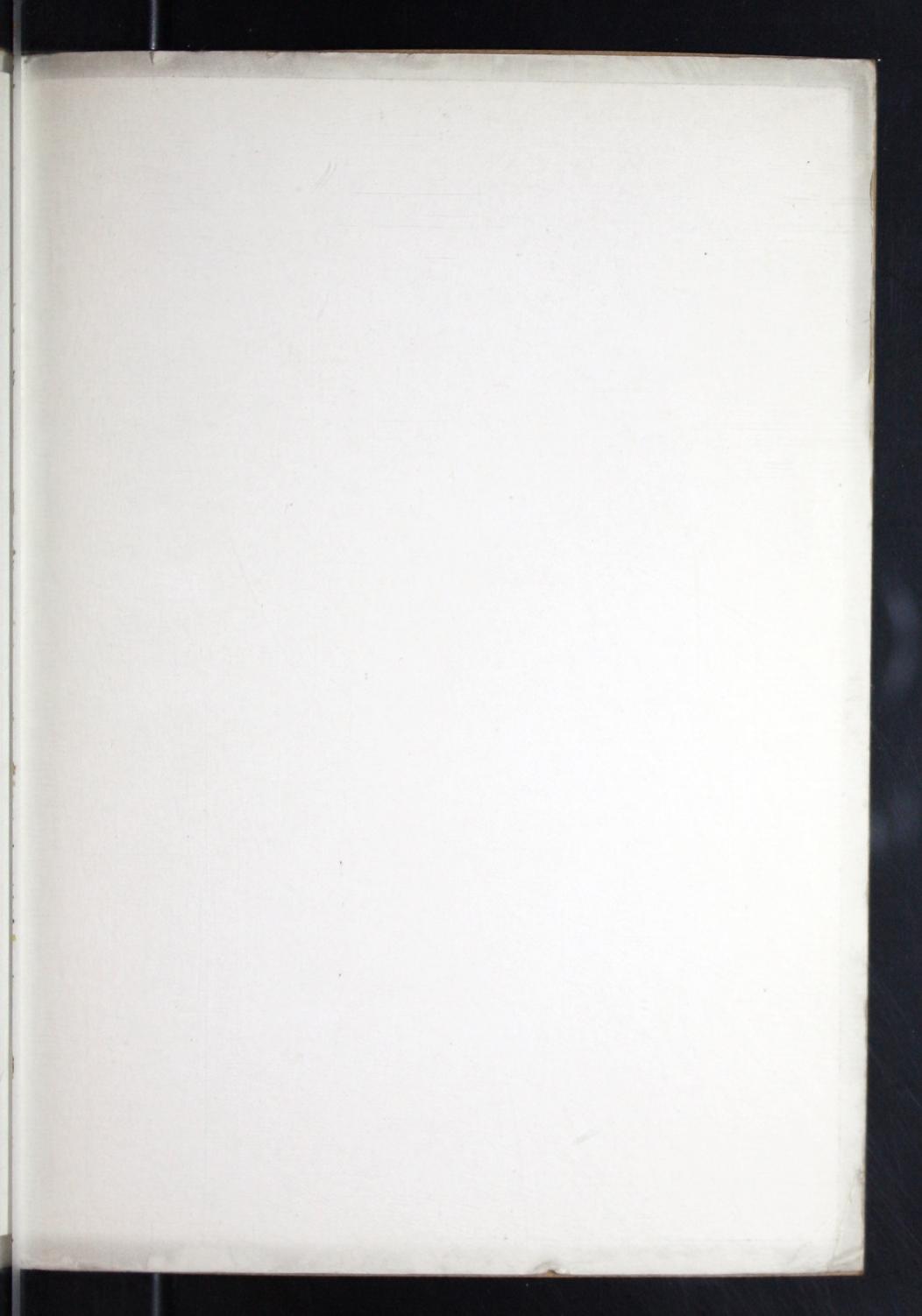
Machinery Isolation—for deadening the noise of fans, pumps and motors

Granulated Cork

Cork Specialties of every description

Written and Designed by Publicity Department
Armstrong Cork Company
Pittsburgh, Pa.





NONPAREIL

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